What is claimed is:

1. A time division multiplexing switch comprising:

a plurality of ingress ports, each of the ingress ports in the plurality for synchronously receiving data grains at fixed time intervals, the data grains ordered as grain groups;

at least one memory egress self selection (MESS) egress port, for receiving the data grains from the plurality of ingress ports and for transmitting stored data grains in a predetermined order, the at least one MESS egress port having a data grain selector for selecting data grains from the received data grains in accordance with at least one predetermined criterion prior to storing the selected grains for transmission by the MESS egress port.

2. The time division multiplexing switch of claim 1 wherein plurality of ingress ports and the at least one memory egress self selection egress ports are equal in number.

3. The time division multiplexing switch of claim 1 further including a grain aggregator, operatively connected to the plurality of ingress ports, for aggregating the data grains received by each of the ingress ports and for providing the aggregate to the at least one MESS egress port.

4. The time division multiplexing switch of claim 1, wherein the data grain selector includes an ingress processor for receiving an aggregate of the data grains received by the plurality of ingress ports, and for selecting data grains from the aggregate for storage in accordance with the at least one predetermined criterion.

5. The time division multiplexing switch of claim 4, wherein the ingress processor includes an interest memory for storing a grain mask corresponding to the predetermined grain selection criterion and a finite state machine for selecting grains from the aggregate for storage in accordance with the grain mask.

6. The time division multiplexing switch of claim 5, wherein the grain mask is based on the associated ingress port and the position of the grain in the respective grain group.

7. The time division multiplexing switch of claim 4, wherein each of the MESS egress ports includes:

a memory for storing the selected data grains, and

an egress processor for reading and transmitting the stored data grains from the memory in a predetermined order.

8. The time division multiplexing switch of claim 7, wherein the ingress processor includes a memory compactor for addressing the selected data grains for storage in the memory without memory fragmentation.

9. The time division multiplexing switch of claim 8 wherein the memory compactor includes a finite state machine for selecting the first available location in memory and a plurality of multiplexers for multiplexing the selected data grains into the memory.

10. The time division multiplexing switch of claim 7, wherein the memory is sized to store exactly one grain group.

11. The time division multiplexing switch of claim 7, wherein the memory stores only the selected data grains.

12. The time division multiplexing switch of claim 7, wherein the egress processor includes an egress processing memory for storing the predetermined order for reading and transmitting the stored data grains.

13. The time division multiplexing switch of claim 12 further including a connection memory for storing connection information, for providing the interest RAM with the predetermined criterion and the egress processing memory with the predetermined order in accordance with the stored connection information.

14. The time division multiplexing switch of claim 7, wherein the egress processor includes an N:1 multiplexer attached to the memory for reading and sequentially transmitting the stored data grains in the predetermined order, where N is the number of ingress ports.

15. The time division multiplexing switch of claim 7, wherein the egress processor includes an N:M mulitplexer attached to the memory for reading and sequentially transmitting a plurality of data grains in the predetermined order, where N is the number of ingress ports and $M \geq 1$.

16. A method of time division multiplex switching received data grains to at least one egress port, the method comprising:

receiving and aggregating a plurality of data grains received in a single timeslot at a number of ingress ports, each of the plurality of data grains being associated with a grain group;

transferring the aggregate of the received data grains to the at least one egress port;

selecting from the aggregate the data grains to be transmitted by the at least one egress port;

storing the selected data grains at the least one egress port; and

transmitting the stored data grains from the at least one egress port in a predetermined order.

17. The method of claim 16 wherein the step of selecting includes applying a mask to the aggregate to select grains in accordance with the ingress port associated with the position of the grain in the aggregate and the position of the grain in its respective grain group.

18. The method of claim 16 wherein the step of storing the selected grains includes storing only the selected grains.

19. The method of claim 16 wherein the step of storing the selected grains includes compactly storing the selected grains in a memory.

20. The method of claim 19 wherein the step of transmitting includes reading stored grains from the memory in a predetermined order.